Fig.1

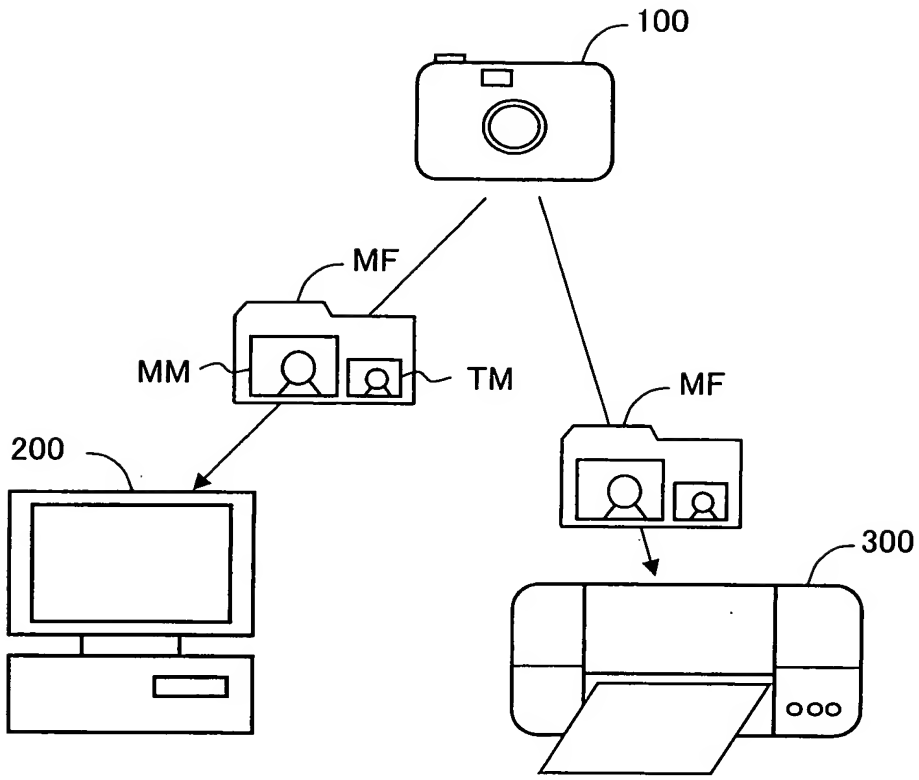


Fig.2

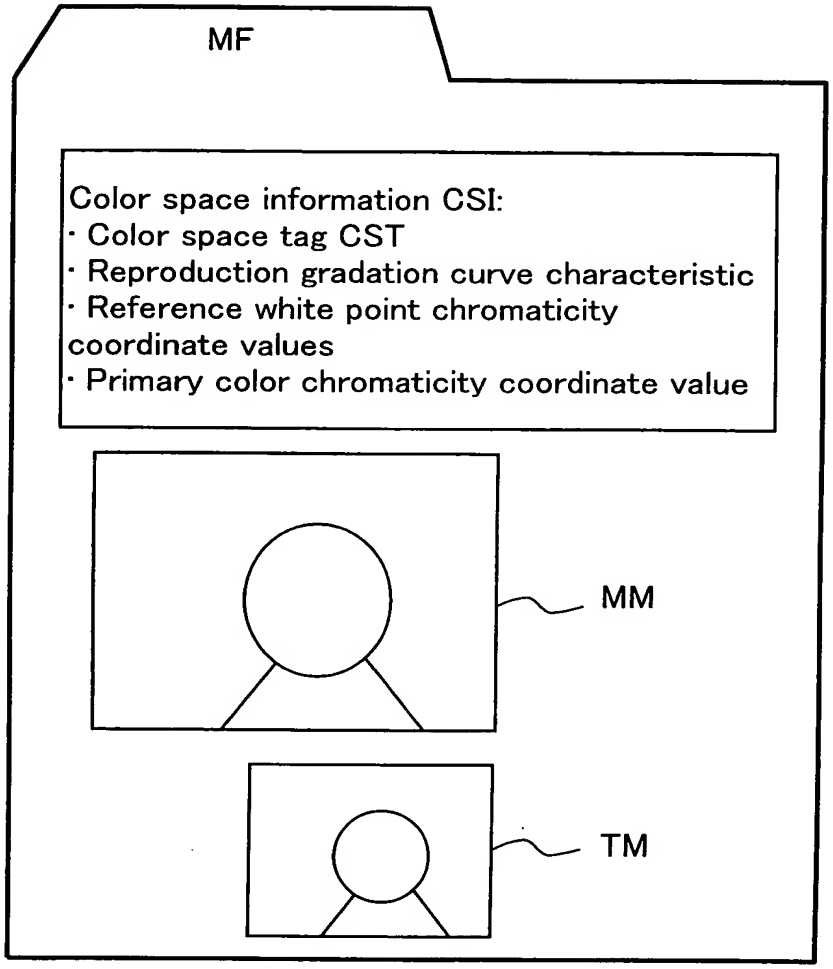

MF
Color space information CSI:
· Color space tag CST
· Reproduction gradation curve characteristic
· Reference white point chromaticity coordinate values
· Primary color chromaticity coordinate value
MM
TM

Fig.3

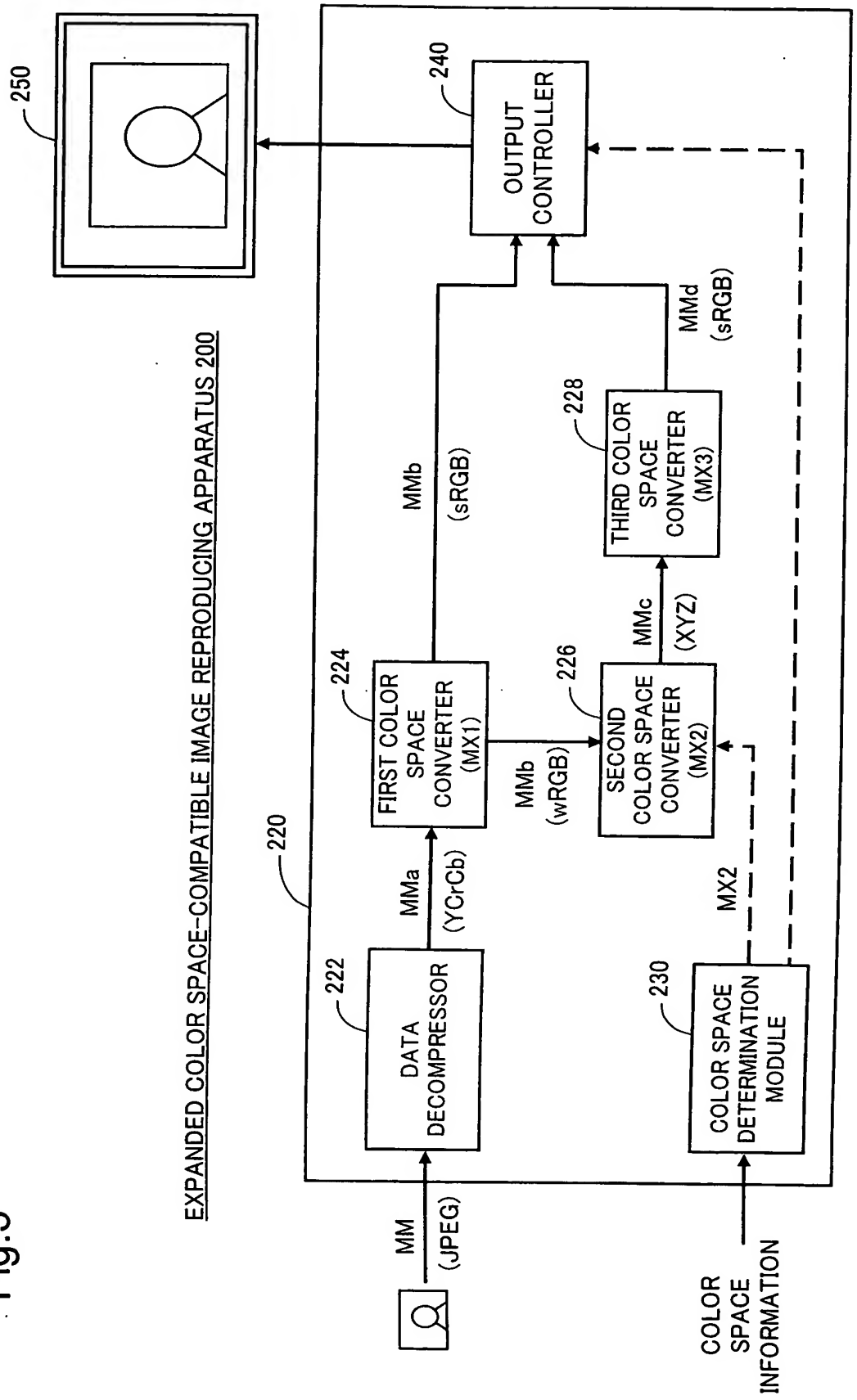

EXPANDED COLOR SPACE-COMPATIBLE IMAGE REPRODUCING APPARATUS 200
220
250
240
OUTPUT CONTROLLER
224
FIRST COLOR SPACE CONVERTER (MX1)
226
SECOND COLOR SPACE CONVERTER (MX2)
228
THIRD COLOR SPACE CONVERTER (MX3)
222
DATA DECOMPRESSOR
230
COLOR SPACE DETERMINATION MODULE
MM (JPEG)
MMa (YCrCb)
MMb (wRGB)
MMb (sRGB)
MMc (XYZ)
MMd (sRGB)
MX2
COLOR SPACE INFORMATION

Fig.4

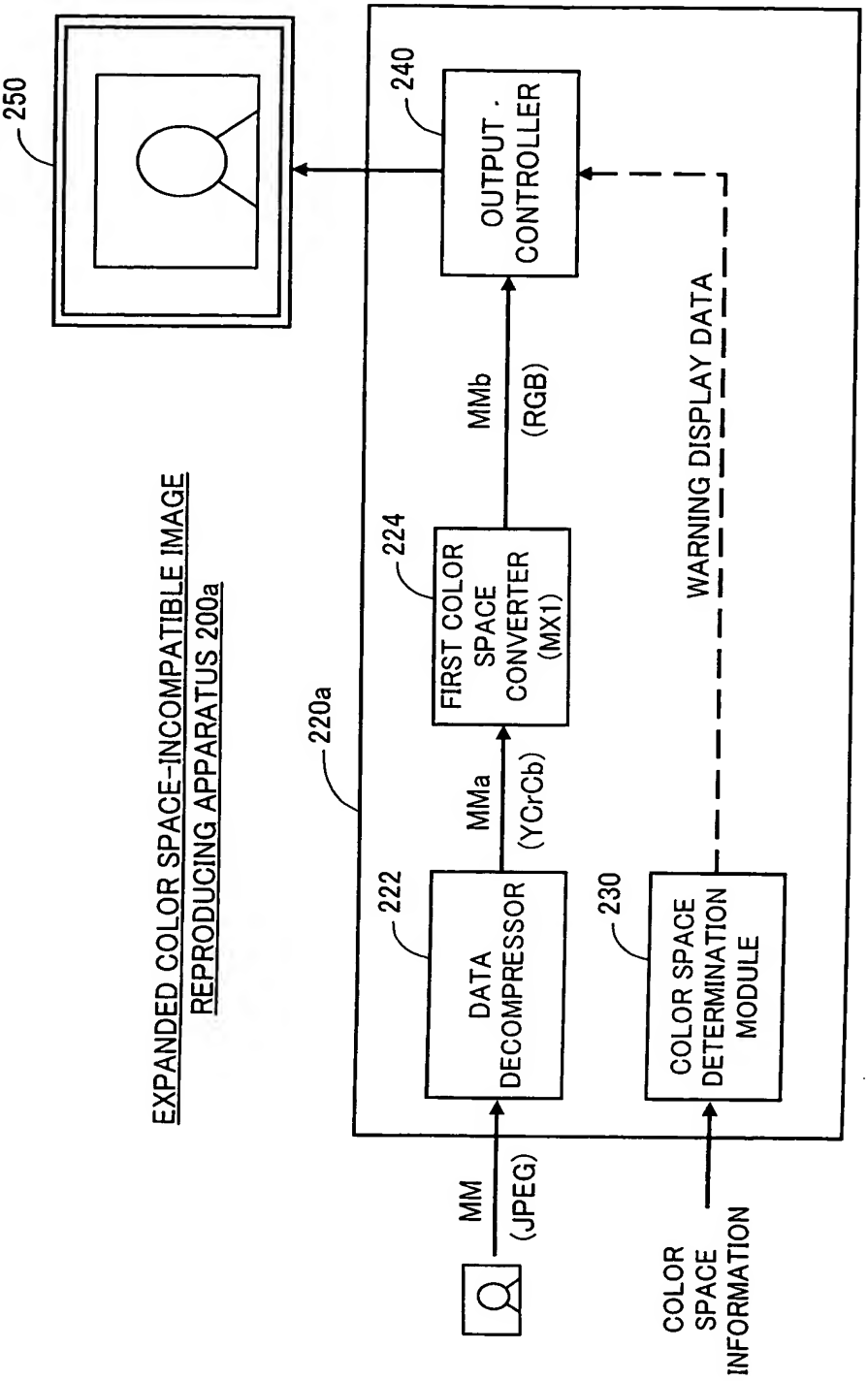

250
240
OUTPUT CONTROLLER
EXPANDED COLOR SPACE-INCOMPATIBLE IMAGE REPRODUCING APPARATUS 200a
220a
224
FIRST COLOR SPACE CONVERTER (MX1)
MMb
(RGB)
WARNING DISPLAY DATA
222
DATA DECOMPRESSOR
MMa
(YCrCb)
230
COLOR SPACE DETERMINATION MODULE
MM
(JPEG)
COLOR SPACE INFORMATION

Fig.5

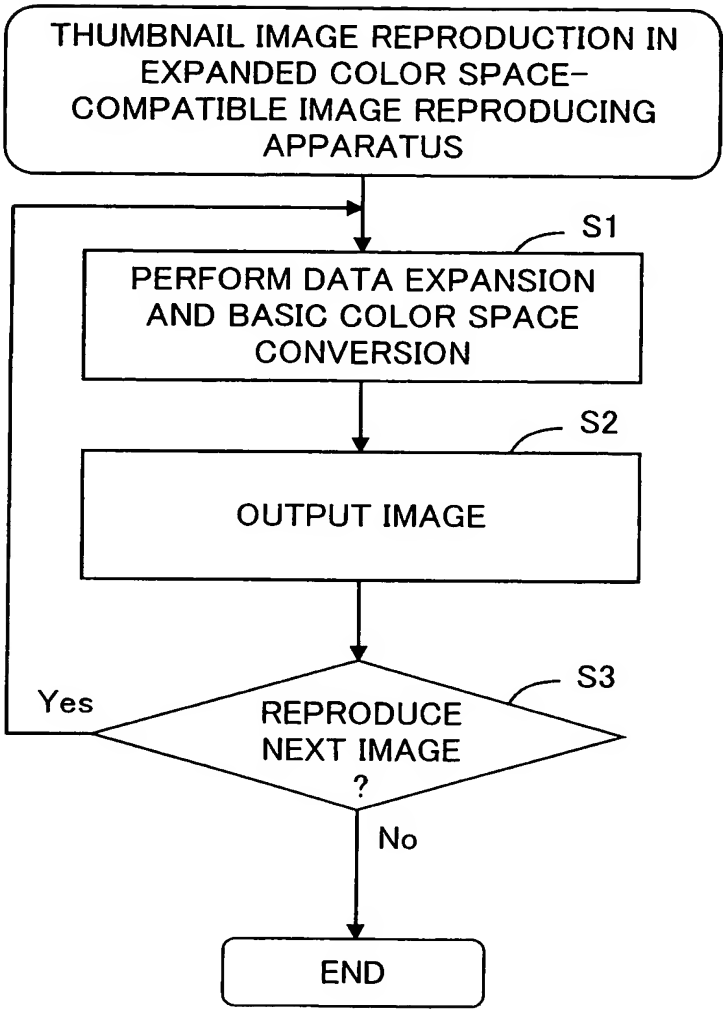

THUMBNAIL IMAGE REPRODUCTION IN EXPANDED COLOR SPACE-COMPATIBLE IMAGE REPRODUCING APPARATUS
S1
PERFORM DATA EXPANSION AND BASIC COLOR SPACE CONVERSION
S2
OUTPUT IMAGE
S3
REPRODUCE NEXT IMAGE ?
Yes
No
END

Fig.6

EXAMPLE OF DISPLAY OF THUMBNAIL IMAGES IN EXPANDED COLOR SPACE-COMPATIBLE IMAGE REPRODUCING APPARATUS

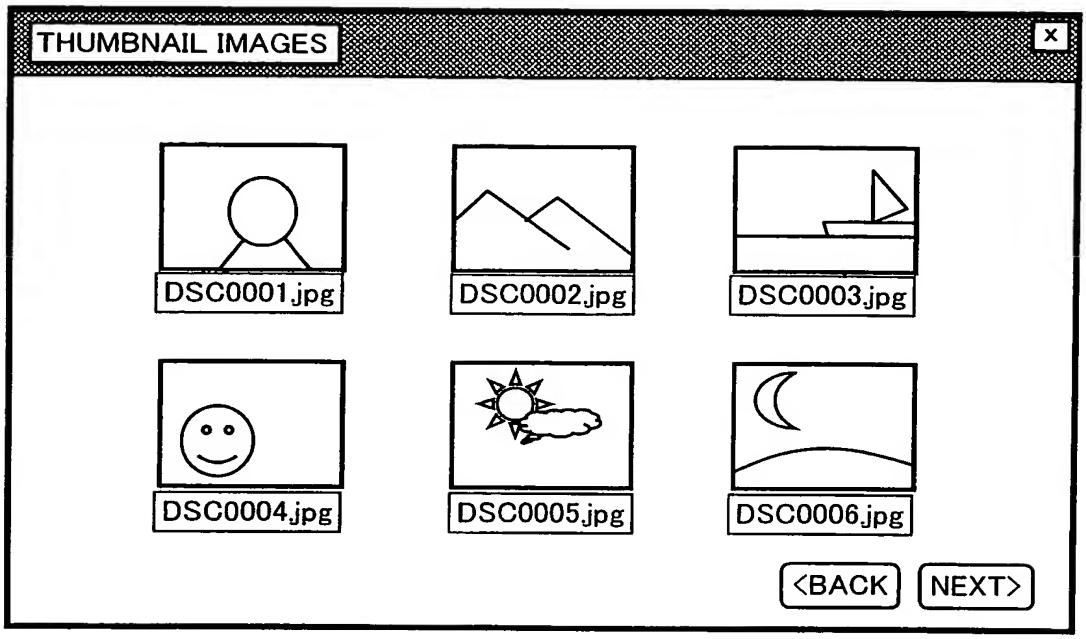


Fig.7

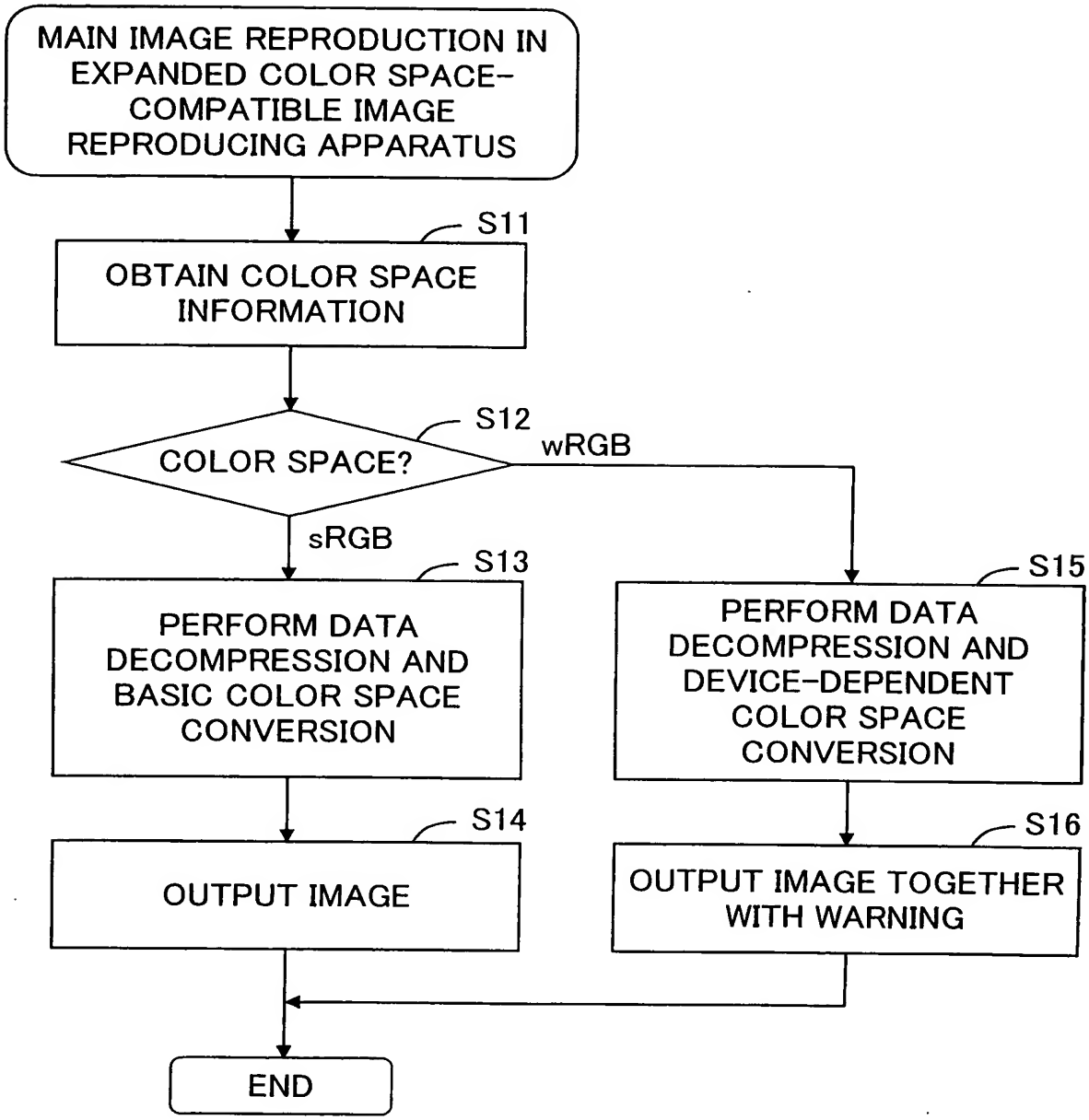

MAIN IMAGE REPRODUCTION IN EXPANDED COLOR SPACE-COMPATIBLE IMAGE REPRODUCING APPARATUS
S11
OBTAIN COLOR SPACE INFORMATION
S12
COLOR SPACE?
wRGB
sRGB
S13
PERFORM DATA DECOMPRESSION AND BASIC COLOR SPACE CONVERSION
S15
PERFORM DATA DECOMPRESSION AND DEVICE-DEPENDENT COLOR SPACE CONVERSION
S14
OUTPUT IMAGE
S16
OUTPUT IMAGE TOGETHER WITH WARNING
END

Fig.8A

EXAMPLE OF DISPLAY OF MAIN IMAGE IN EXPANDED COLOR SPACE-COMPATIBLE IMAGE REPRODUCING APPARATUS (sRGB IMAGE DATA)

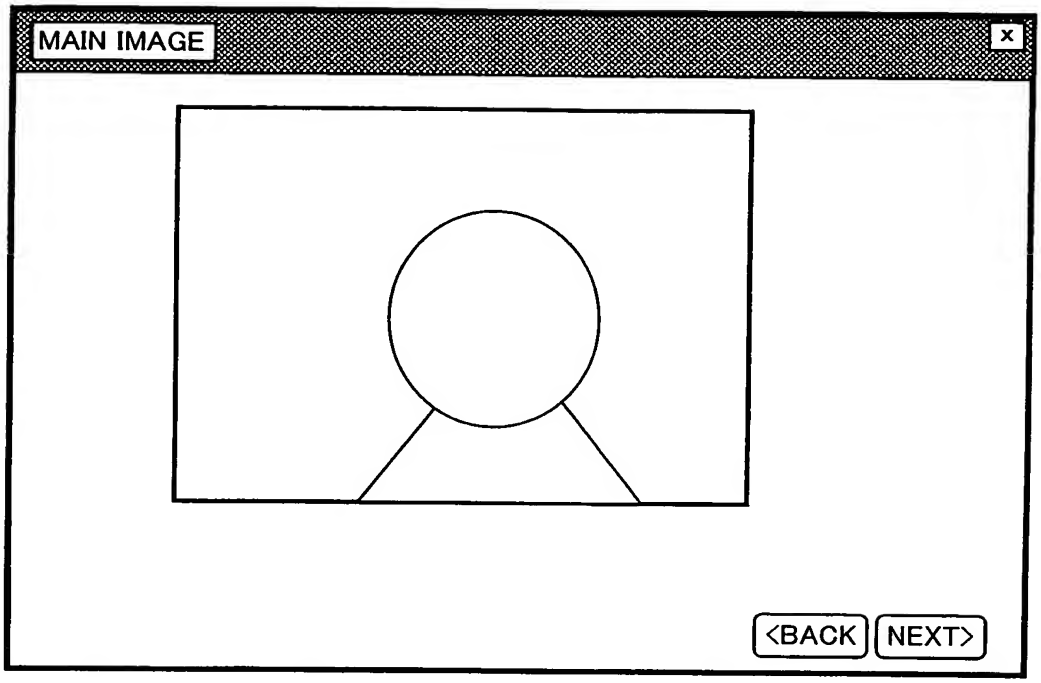


Fig.8B

EXAMPLE OF DISPLAY OF MAIN IMAGE IN EXPANDED COLOR SPACE-COMPATIBLE IMAGE REPRODUCING APPARATUS (wRGB IMAGE DATA)

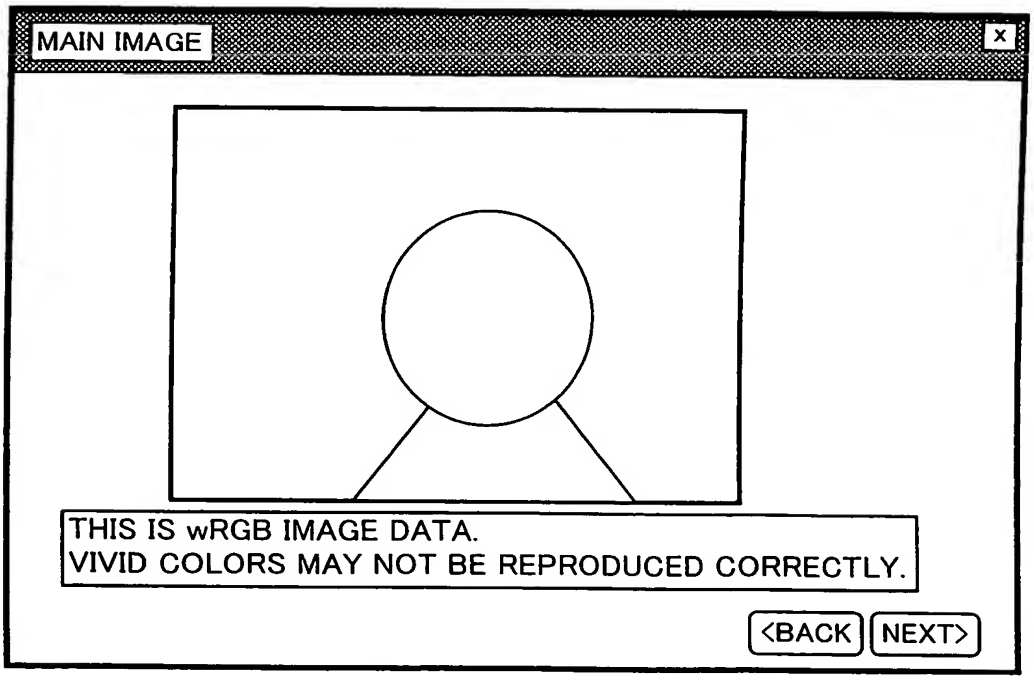


Fig.9

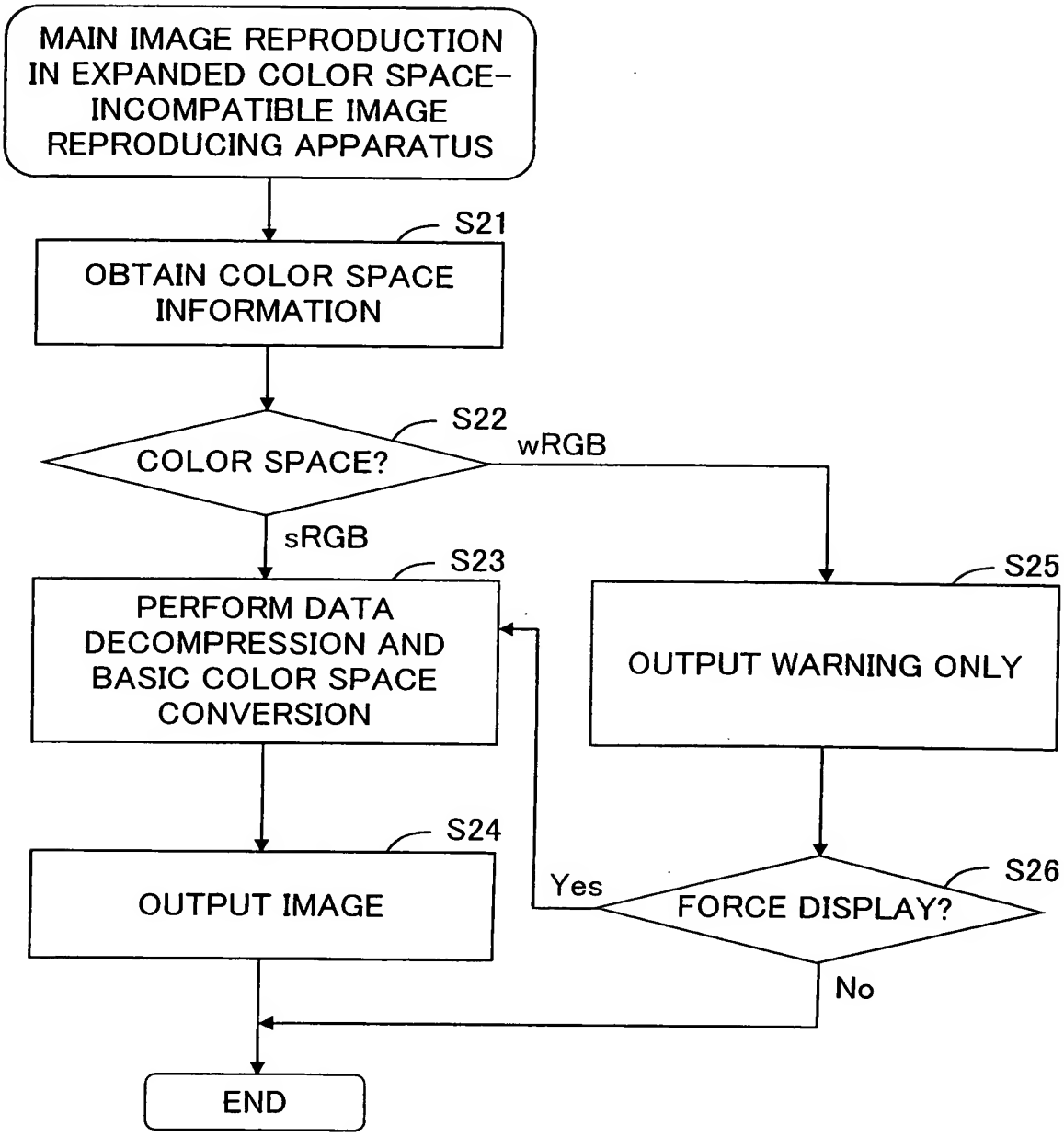

MAIN IMAGE REPRODUCTION IN EXPANDED COLOR SPACE-INCOMPATIBLE IMAGE REPRODUCING APPARATUS
S21
OBTAIN COLOR SPACE INFORMATION
S22
COLOR SPACE?
wRGB
sRGB
S23
PERFORM DATA DECOMPRESSION AND BASIC COLOR SPACE CONVERSION
S24
OUTPUT IMAGE
S25
OUTPUT WARNING ONLY
S26
FORCE DISPLAY?
Yes
No
END

Fig.10A

EXAMPLE OF DISPLAY OF MAIN IMAGE IN EXPANDED COLOR SPACE-INCOMPATIBLE IMAGE REPRODUCING APPARATUS (sRGB IMAGE DATA)

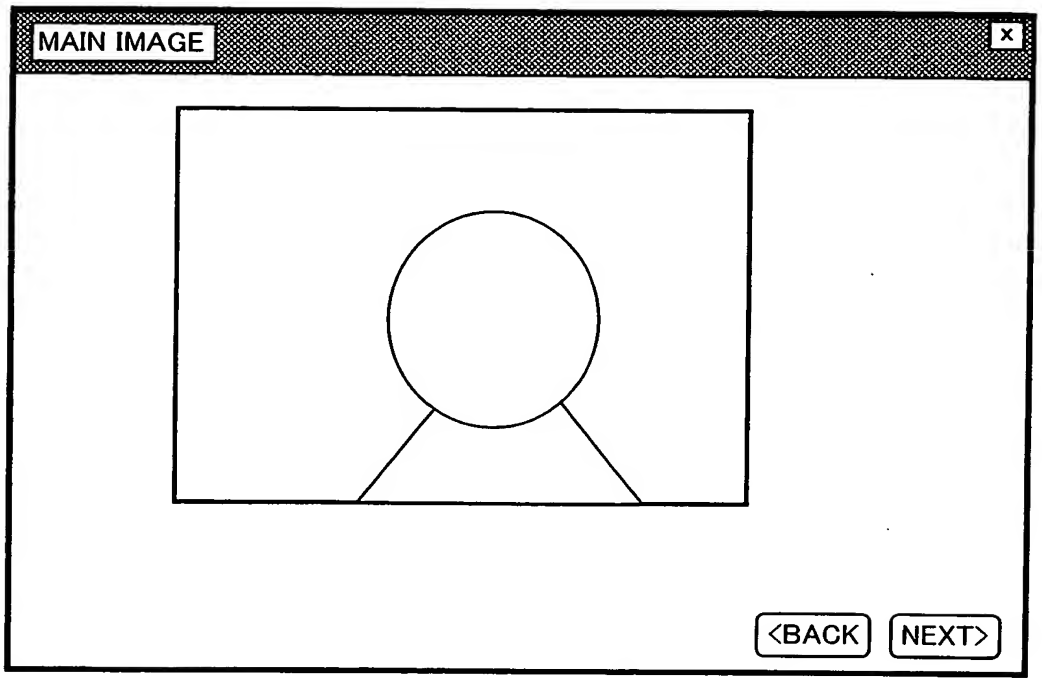


Fig.10B

WARNING DURING DISPLAY OF MAIN IMAGE IN EXPANDED COLOR SPACE-INCOMPATIBLE IMAGE REPRODUCING APPARATUS (wRGB IMAGE DATA)

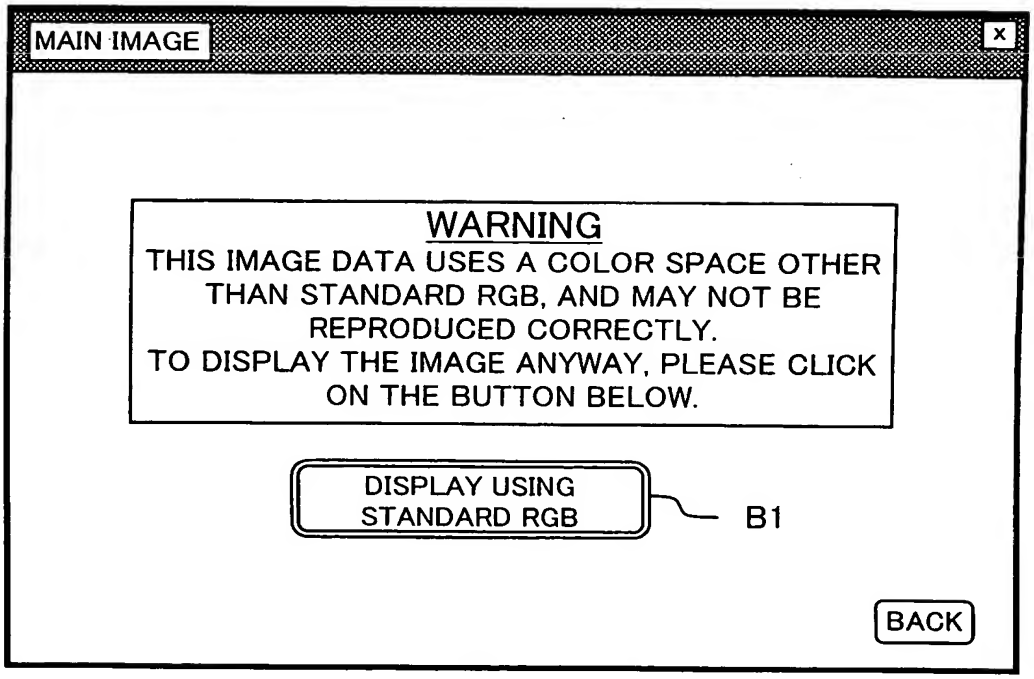


Fig.11

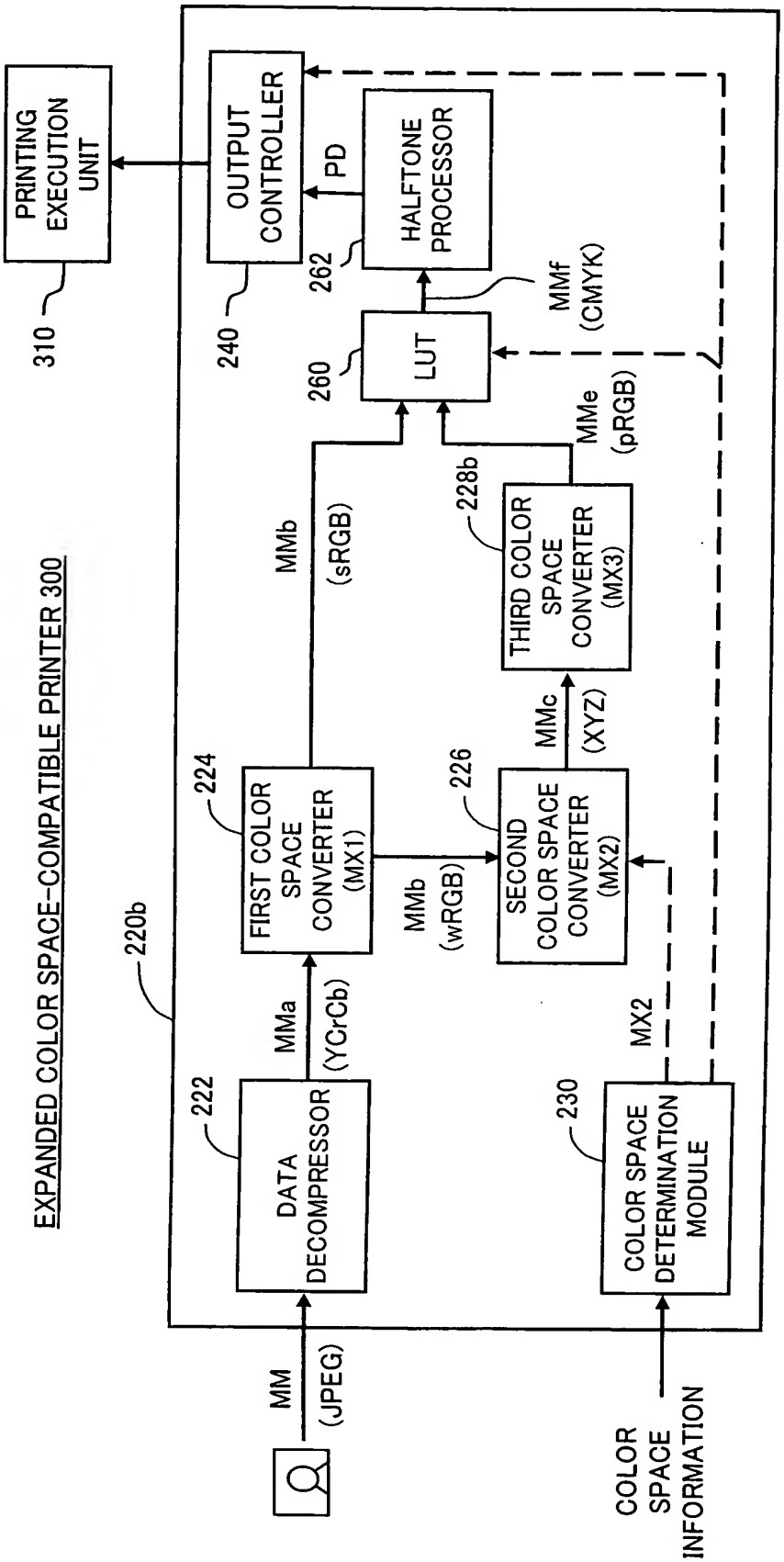

EXPANDED COLOR SPACE-COMPATIBLE PRINTER 300
220b
PRINTING EXECUTION UNIT
310
OUTPUT CONTROLLER
240
PD
HALFTONE PROCESSOR
262
LUT
260
MMf (CMYK)
MMe (pRGB)
THIRD COLOR SPACE CONVERTER (MX3)
228b
MMb (sRGB)
FIRST COLOR SPACE CONVERTER (MX1)
224
MMb (wRGB)
SECOND COLOR SPACE CONVERTER (MX2)
226
MMc (XYZ)
MMa (YCrCb)
DATA DECOMPRESSOR
222
MX2
COLOR SPACE DETERMINATION MODULE
230
MM (JPEG)
COLOR SPACE INFORMATION

Fig.12

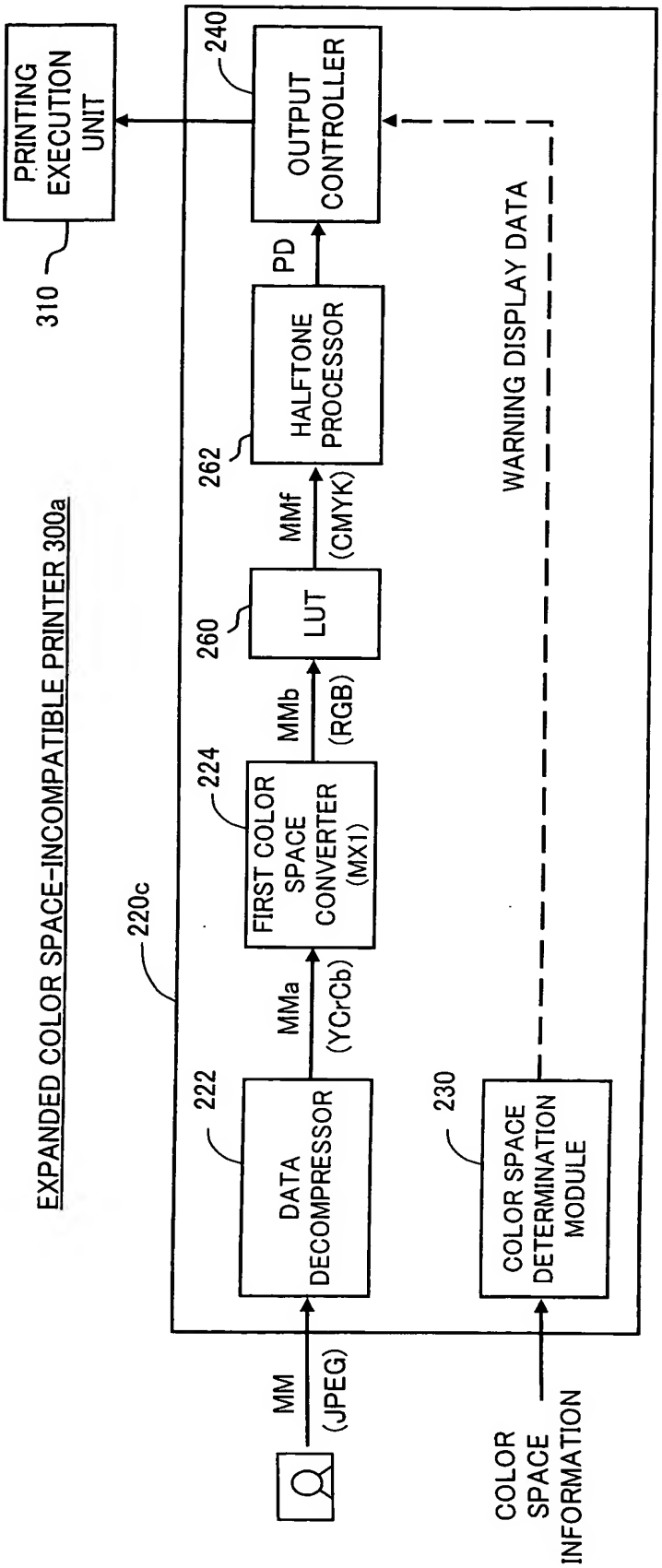

EXPANDED COLOR SPACE-INCOMPATIBLE PRINTER 300a
220c
PRINTING EXECUTION UNIT
310
OUTPUT CONTROLLER
240
HALFTONE PROCESSOR
262
PD
LUT
260
MMf
(CMYK)
FIRST COLOR SPACE CONVERTER (MX1)
224
MMb
(RGB)
DATA DECOMPRESSOR
222
MMa
(YCrCb)
COLOR SPACE DETERMINATION MODULE
230
WARNING DISPLAY DATA
MM
(JPEG)
COLOR SPACE INFORMATION

Fig.13

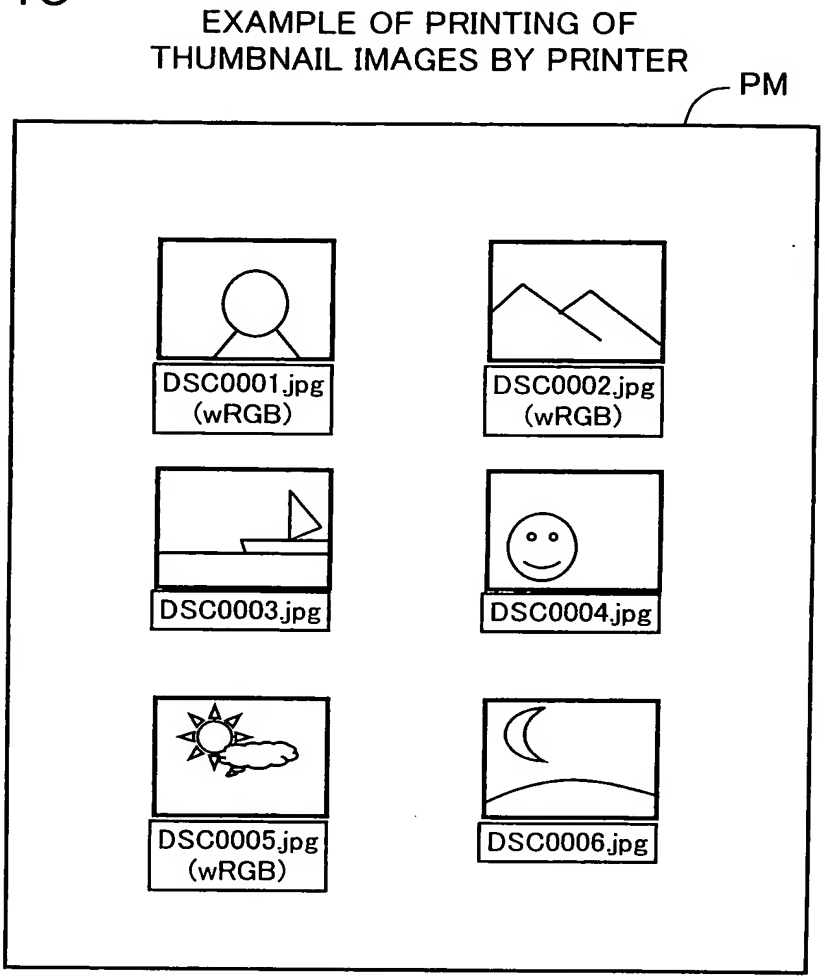

EXAMPLE OF PRINTING OF
THUMBNAIL IMAGES BY PRINTER
PM
DSC0001.jpg
(wRGB)
DSC0002.jpg
(wRGB)
DSC0003.jpg
DSC0004.jpg
DSC0005.jpg
(wRGB)
DSC0006.jpg

Fig.14

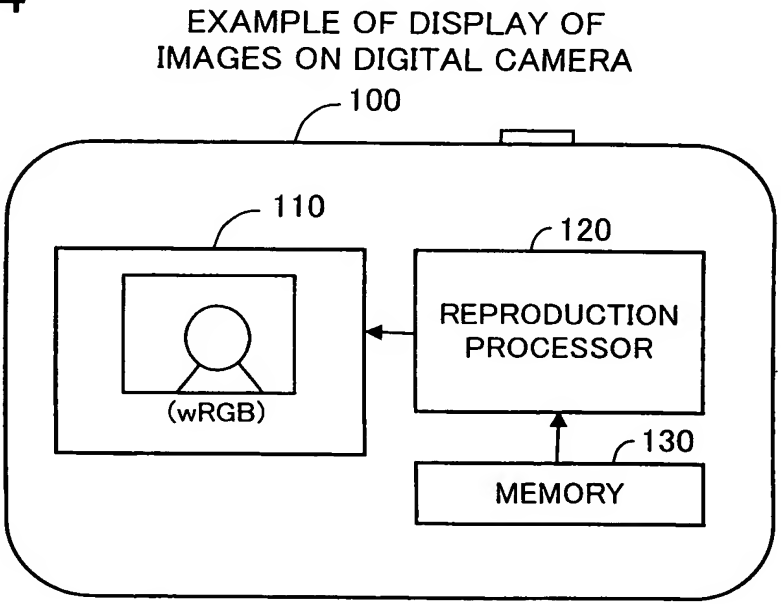
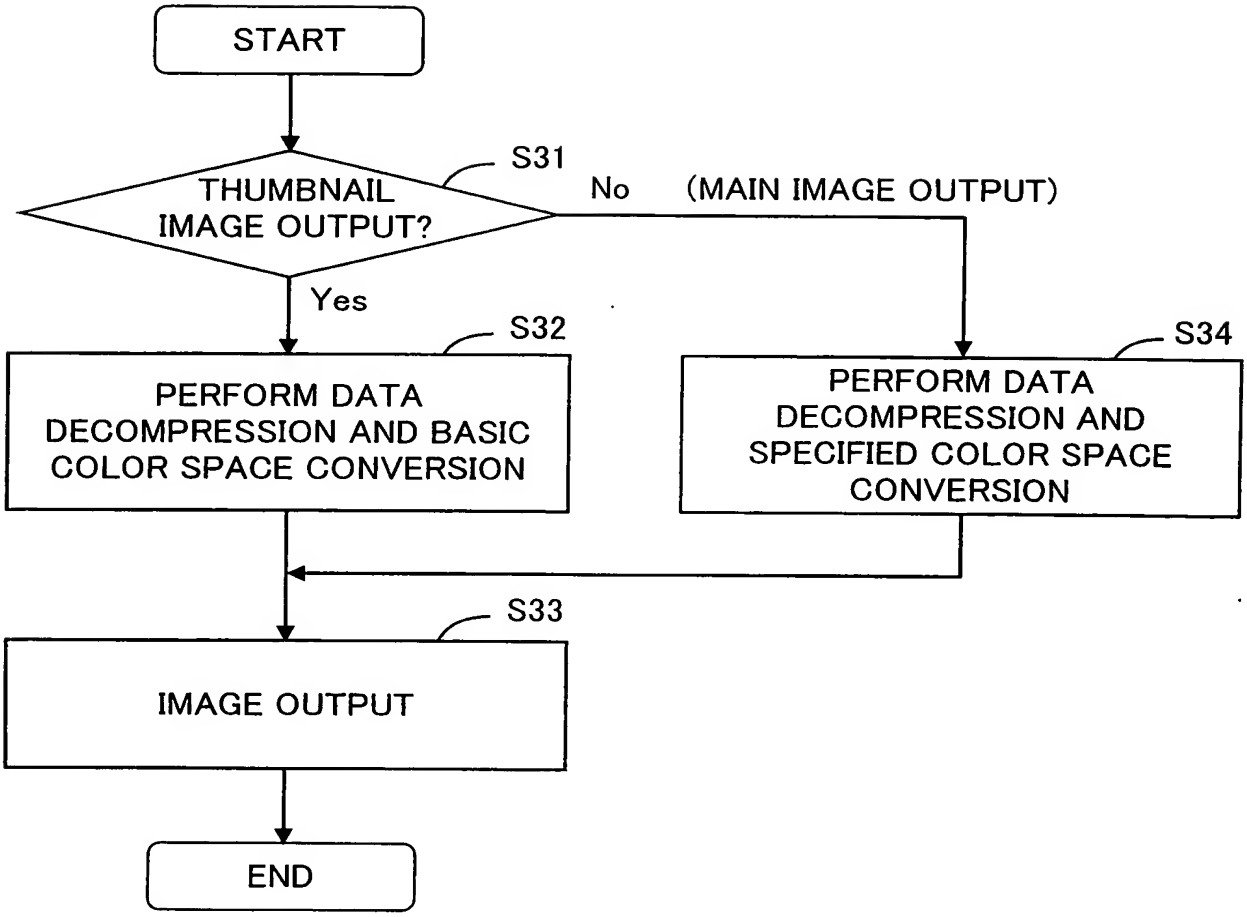

EXAMPLE OF DISPLAY OF
IMAGES ON DIGITAL CAMERA
100
110
120
(wRGB)
REPRODUCTION
PROCESSOR
130
MEMORY

Fig.15


START
S31
THUMBNAIL IMAGE OUTPUT?
No
(MAIN IMAGE OUTPUT)
Yes
S32
PERFORM DATA DECOMPRESSION AND BASIC COLOR SPACE CONVERSION
S34
PERFORM DATA DECOMPRESSION AND SPECIFIED COLOR SPACE CONVERSION
S33
IMAGE OUTPUT
END